INV-DC200

CE 0482

Dual Mode Digital Infrared Thermometer

Instruction Manual Ver 2.1

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MOVING FRONTIERS

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Version 2.1

Issuing Date: June 2015

To download the latest manual for the thermometer, simply scan the QR code above or visit
http://innovogroups.com/products/innovo-thermometer

Introduction

Thank you for purchasing the Innovo INV-DC200 Dual Mode Digital Infrared Thermometer. INV-DC200 has undergone rigorous clinical tests and has proven to be safe, reliable and accurate when used in accordance with the operation manual.

We wanted to make a thermometer that will accompany your child from infancy to adulthood. That is why the INV-DC200 Dual mode infrared thermometer was designed to measure the body temperature via the subject's ear and/or forehead. We recommend that you use the forehead measurement mode for your children who are < 1 yr old and move to the eardrum measurement mode when they are older and more comfortable with a foreign object in their ear.

Please read the instructions carefully before using the product, and put it in a safe and secure place for future reference.

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1. Features of Dual mode infrared thermometer INV-DC200

The INV-DC200 is able to take both forehead and ear temperature measurements by detecting the infrared heat given off by the respective areas. Forehead temperature measurements range from 89.6°F - 107.9°F (32 °C – 42.2 °C), and eardrum temperature measurements from 32.0°F - 212.0°F (0 °C- 100 °C).

Convenient and easy to use

- Easy mode of operation – No confusing menus and buttons
- Can be used anytime – even when your child is asleep
- Measures faster than oral thermometer and more comfortable than rectal thermometer
- Ergonomic design
- Color coded display for fever

Accurate and quick

Uses latest infra-red scanning technology – precise and immediate measurements

Safe and hygienic

- Unlike traditional thermometers, there is no glass or mercury that could pose as a potential health hazard. The thermometer is made up of ABS and TPR plastics, a temperature sensor, an Infrared temperature measuring element, a microcomputer controlled circuit and a LCD screen.
- BPA and latex free.

Memory Recall

Has a Memory Mode that can recall 20 readings to track changes in temperature.

Convenient Fever warning

When the temperature exceeds 99.5°F/37.5°C, the thermometer will warn the user that he/she may have a fever by 7 rapid short beeps and a flashing red backlight for for 3 seconds. (For normal body temperature, the signal is a long beep with a green backlight)

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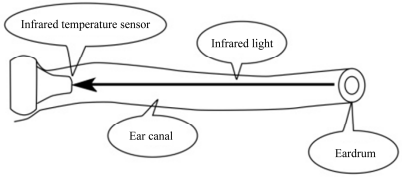
Symbol	Description
	Waste electrical materials should be sent to dedicated collection points for recycling.
⚠ Warning	A personal injury or meter damage may result if the meter is not correctly used.
⚠ Notice	Inaccurate reading or meter damage may result if the meter is not correctly used.

Warning!
This product is not intended to substitute advice from a physician, pharmacist, or other licensed health-care professional. You should not use this product for self-diagnosis or for treating a health problem. Contact your health-care provider immediately if you suspect that you have a medical problem.

Operating principle
The infrared temperature sensor collects infrared energy emitted from the eardrum. After being focused by a lens, the energy is converted into a temperature reading by the thermopiles and measurement circuits.



2. Precautions - Care and Maintenance

- Do not use the thermometer for purposes not specified in this User Manual. Follow the instructions stated herein and operate the thermometer carefully when measuring children's temperature.
- The device is not designed to be used for newborn babies.
- The device is not a continuous monitoring device.
- Do not use the thermometer under an ambient temperature higher than 40°C (104°F) or lower than 10°C (50°F), which is beyond the operating temperature range of the thermometer. To ensure accurate readings, keep the thermometer under room temperature for more than 30 minutes before use.
- Wait at least 10 seconds between every two consecutive readings. Start a measurement after the measurement symbol is displayed.
- **Do not touch the tip of the temperature probe, on which a precise temperature sensor resides.**
- **CAUTION! The sensor is extremely sensitive to dirt and oil. Check the sensor regularly. The surface should be reflective and gleaming. If it looks dull and lackluster, then you need to clean the sensor before use.**
- To clean the device, use a q-tip cotton swab moistened with alcohol

(70% Isopropyl) to clean the casing and the measuring probe. Please wait 5-10 minutes for the alcohol to completely evaporate before using the thermometer.

- INV-DC200 is not waterproof. Please do not immerse it into the water or other liquids.
- Certain parts of the thermometer are fragile and must be lined precisely to perform their functions. Do not drop the thermometer or twist the thermometer sensor. The thermometer is not designed to withstand intense impact or vibration.
- Please do not use the product if the any part of the thermometer, especially the sensor, shows any sign of damage. Do not attempt to repair the product. Please contact your distributor immediately.

●Operating Conditions:
Temperature: 50 °F -104 °F (10°C - 40°C)
Humidity: <80% RH, non-condensing
Atmospheric pressure: 860hPa to 1060hPa

●Storage and Shipping Conditions:
Temperature: 14 °F-140 °F (-10°C - 60°C)
Humidity: 0 - 95% RH, non-condensing
Atmospheric pressure: 860hPa to 1060hPa

●Battery Installation:
1. Put two AAA batteries into the battery compartment according to the stated polarities.
2. Push the battery cover horizontally along the arrow to close.

Notes:

☆ If this is your first time using the thermometer, please remove the protective plastic sheet .
☆ Batteries should be installed according to the stated polarities. Otherwise, the device bracket might be damaged.
☆ Please remove the batteries if you are not planning to use the thermometer for a long time.

Warnings

- This is not a toy. Please keep the Dual mode infrared thermometer out of children's reach.
- The infrared Dual mode infrared thermometer is not a replacement for seeking medical assistance.

16.battery	Changeable for two 1.5V triple AAA batteries
17.Battery life	More than 3000 times
18.Accuracy for clinical test	The maximum allowable error for clinical test is specified in the formula below: $Terror = \frac{\lvert T1\text{-}Tref \rvert + \lvert T2\text{-}Tref \rvert}{2}$ ≦0.6°F/0.3°C (for 95%) Among which: T1 and T2 represent temperature value for thermometer under test respectively, Tref represents the constant reference temperature

9. Warranty and After-Sale Service

For enquiries, please email cs@innovogroups.com

The device is under warranty for one year after the date of acquisition. To extend your warrant period for an additional 2 years, please go to http://www.innovogroups.com and register your purchase.

Batteries, packaging, and any damage caused by improper use are not under warranty.

10. Symbols

Symbol	Description
	The product is a Type BF device.
	Attention! Please refer to this User Guide.
	The action expressed in words beside the symbol is prohibited.
	Manufacturer information, including its name and address

1.Applicable regulations and laws	ASTM 1965/EN12470-5/GB/T 19146-2010
2.Temperature units	°F/°C, adjustable
3.Measurement range	Forehead temperature mode: 89.6°F – 107.9 °F/32.0°C-42.2°C ear temperature mode:/32.0°F – 212.0 °F/ 0°C-100.0°C
4.Precision	±0.4°F/±0.2°C
5.Display resolution	0.1°F/0.1°C
6.Latency Time	1 second
7.Abnormal state display	LCD displays “L °C” if the measured temperature is below the minimum of measurement range. LCD displays “H °C” if the measured temperature is below the minimum of measurement range. LCD displays “Er1”if the temperature measurement circuit is abnormal (fault of SENSOR or the temperature measurement circuit), or the ambient temperature exceed 50°F-104°F (10°C~40°C). There shall be “ErC” if the calibration process is not completed or EEPROM is abnormal.
8.Sound	volume≧50 db (the perpendicular distance from dB Volume sensor to thermometer is 10cm)
9.Automatic shutdown function	10s±1s
10.Low-voltage display function	The product shall display low-voltage signal if the voltage is below 2.51V±0.15V.
11.Memory function	Memorize 20 groups of measured temperature.
12.Current consumption	$I_{stand\text{-}by}$<2μA; $I_{working}$<0.5mA; $I_{Buzzer\ on}$<2mA; $I_{banklight}$<15mA
13.LED backlit specifications	≧1.2cd/m^2
14.Operational conditions	ASTM (50°F-104°F)10°C-40°C /15-95%RH
15.Type of measuring	Applicable for forehead temperature and ear temperature

3. Body Temperature

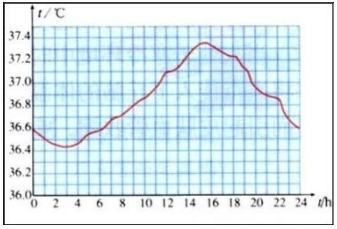
You can take a body temperature via the forehead, ear canal, armpit, mouth or rectum. The temperature measured at different parts of the body may differ slightly.

Body Part Normal Temperature Range

Forehead	96.44°F-100.04°F (35.8°C–37.8°C)
Ear canal	96.44°F-100.4°F (35.8°C–38.0°C)
Mouth	95.9°F-99.5°F (35.5°C–37.5°C)
Armpit	94.46°F-99.14°F (34.7°C–37.3°C)
Rectum	97.88°F-100.4°F (36.6°C–38.0°C)

The normal body temperature range slightly varies with age and gender. Generally, newborns or children have higher body temperatures than adults, and adults have higher body temperatures than the elderly. Women's body temperatures are approximately 0.3°C (0.5 °F) higher than men's.

Variation in body temperature



Normal body temperature varies by the time of day and is also affected by external factors.
The body temperature of an individual is the highest between 2:00 a.m. and 4:00 a.m. and the lowest between 2:00 p.m. and 8:00 p.m. An individual's body temperature typically changes by less than 1°C (1.8 °F) each day.

4. Product designs

(1) Sensor (Take cover off to measure eardrum temperature)
(2) F1: Button for measuring forehead temperature
(3) F2: Button for measuring eardrum temperature and access Menu options
(4) LCD display
(5) Battery cover

5. Measuring forehead temperature

Hold the F1 button down and scan the forehead from side to side with the thermometer. You will hear a subtle clicking sound while the thermometer is in the scanning mode. Release the F1 button when you are done scanning. The maximum value will be displayed on the LCD screen. **If you do not move the thermometer across the forehead but take a fixed point measurement instead, it may result in an incorrect temperature reading.** You can take another measurement by pressing the F1 button again at any time.

6. Measuring temperature via the eardrum

Remove the sensor cover and insert the sensor into the ear canal.

Symptom	Possible Cause	Solution
symbol is displayed after the thermometer powers on.	low.	same model or specifications.
"Er1" is displayed.	The ambient temperature is lower than 10°C (50.0°F) or higher than 40°C (104°F).	Take a measurement under an ambient temperature between 10°C (50.0°F) and 40°C (104°F).
The temperature reading is lower than the typical body temperature range.	The lens of the temperature probe is dirty.	Clean the lens using a cotton swab.
	The thermometer probe is not aligned to the eardrum.	Reposition the thermometer probe so that it is aligned to the eardrum.
	The thermometer is not used within 30 minutes after being taken from a cold environment.	Wait for more than 30 minutes after the thermometer is moved into the measurement environment.
The temperature reading is higher than the typical body temperature range.	The temperature probe is faulty.	Contact Innovo.

8. Technical specifications

Items	Standards
models	Dual mode infrared thermometer INV-DC200

Er1	It shall display “Er1” when ambient temperature exceeds 104°F/40.0°C or drop below 50.0°F/10.0°C.	3 short tick and green backlit for 3 seconds.
ErC	It shall display “ErC” if there is EEPROM data reading error or the correcting process is not finished. Please contact your supplier.	3 short tick and green backlit for 3 seconds.
	Low-voltage signal when the battery voltage is below2.61V±2%. Please replace battery.	silence
Power Off Mode		
The thermometer will power off automatically if no activity is detected for 5 seconds.		

Attention:
●Electromagnetic interference: INV-DC200 contains sensitive electronic components, and you should not use product in an area with electromagnetic interference (e.g. near mobile phones and microwaves)
●Please dispose the used products and batteries in accordance with local regulation requirements.
●Please remove the battery if you do not plan to use the device for long time.

7. Troubleshooting

Symptom	Possible Cause	Solution
The thermometer fails to power on.	The battery level is extremely low.	Use new batteries of the same model or specifications.
	Polarities of the batteries are reversed.	Ensure that the batteries are correctly installed according to the polarity symbols in the battery compartment.
	The thermometer is faulty.	If the warranty period does not expire, contact Innovo.
Only the battery	The battery level is	Use new batteries of the

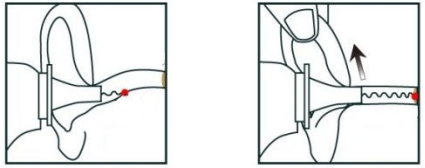


Figure 1

For children > 1 year old, gently pull the ear up to ensure the ear canal is straight (See Figure 1). Position the temperature probe carefully so that it is aligned with the eardrum to ensure accurate measurement readings. This applies to adults as well. For children < 1 year old, gently pull the ear straight back to ensure the ear canal is straight (see Figure 2).

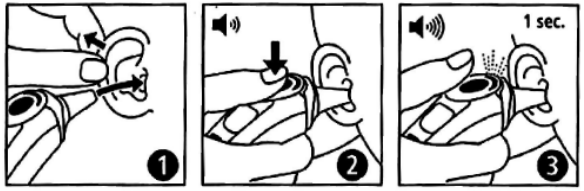


Figure 2

Press button F2 to take measurement. The temperature will be shown on the LCD display. **Do not press the F2 button for more than 3 seconds as you will activate the memory retrieval mode.** . You can take another measurement by simply pressing the F2 button again.

In order to avoid inaccuracy:
1. Please make sure that there is no dirt on the temperature sensor
2. Please use the thermometer indoors or in an environment where there is no strong air draft
3. Try to keep the subject stationary.
4. Make sure there isn’t any sweat, water or condensation on the forehead.
5. If INV-DC200 is transferred from an environment where the ambient temperature might be different, please wait 10 minutes and follow rule

number 2 before using the thermometer.

6. Do not hold INV-DC200 for a long time as it is highly sensitive to heat.
7. Keep the temperature probe clean to ensure accurate readings.
8. Before measuring temperature from an ear canal, remove earwax, if any. Keep the ear canal clean.

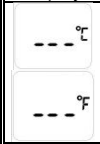
6. Instructions for display and operation

LCD display	Operational method and instruction for displays	Sound and backlit
	1.Measurement of forehead temperature Hold down the F1 button and scan the sensor across the forehead from left to right. Once the button is released, the maximum temperature will be shown on the LCD display. 2.Measurement of ear temperature Press button F2. Once the button is released, the temperature will be shown on the LCD display. 3. To measure again, simply press button F1/F2	When the temperature is between 89.6°F/ 32.0°C and 99.6°F/ 37.6°C, there will be a long beep and a green backlit will be displayed for 3 seconds. When the temperature is between 99.6°F/37.6°C and 107.9°F/42.2°C, there will be 7 short beeps and the display will flicker with a red backlit for 3 seconds. This indicates that the subject may have a fever. Please consult your doctor if you are not sure.
or or	Forehead Measurement mode Eardrum measurement mode	
	The measured value exceeds 107.9 °F/42.2°C.	7 short beeps and the display will flicker with a red backlit for 3 seconds
	The measured value falls below 89.6°F/32°C.	7 short beeps and the display will flicker with a red backlit for 3 seconds

Inquiry for memory data, Storing 20 groups of data

LCD display	Operational method and instruction for displays	Sound and backlit
	Press and hold button F2 between **3-6seconds** and the LCD will display "- - -" with the M signal blinking.	silence
	Press button F2 again and the LCD will display the first data group with the M signal blinking. Press button F2 and it shall display the second data number group for 1 second before displaying the measured data and mode icon. The thermometer can record 20 groups of data.	silence
	The LCD will display "- - -" with the M signal blinking if there is no test data.	silence

C/F conversion

LCD display	Operational steps	Sound and backlit
	Press and hold button F2 for **6-9 seconds** when the thermometer is off. The temperature unit starts blinking. Press button F2 within 5 seconds to change the temperature unit to your choice.	silence

Error message